

## PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference BW293R/REPA/rr	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/T 03/00449	International filing date (day/month/year) 21.07.2003	Priority date (day/month/year) 21.07.2003
International Patent Classification (IPC) or both national classification and IPC A61C7/12		
Applicant SCUZZO, Giuseppe		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I  Basis of the opinion
- II  Priority
- III  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV  Lack of unity of invention
- V  Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI  Certain documents cited
- VII  Certain defects in the international application
- VIII  Certain observations on the international application

Date of submission of the demand 18.03.2004	Date of completion of this report 05.12.2005
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# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IT 03/00449

## I. Basis of the report

- With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

### Description, Pages

2-5 as originally filed  
1, 1a received on 17.11.2005 with letter of 17.11.2005

### Claims, Numbers

1-16 received on 17.11.2005 with letter of 17.11.2005

### Drawings, Sheets

1/2, 2/2 as originally filed

- With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

- With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

- The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-16
	No: Claims	
Inventive step (IS)	Yes: Claims	1-16
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-16
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

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**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents :

D1: US-A-4 917 602 (BROUSSARD GARFFORD J) 17 April 1990 (1990-04-17)  
D2: US-A-3 327 393 (BRADER ALLEN C) 27 June 1967 (1967-06-27)

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1 and shows a lingual orthodontic bracket comprising a base attachable to the lingual side, a main body constructed in several pieces, a plurality of engaging tabs, a housing for the archwire extending along the dental arc, said housing opening perpendicular to the base.

The subject-matter of claim 1 differs from this known bracket in that it is made of a single piece and, more importantly, that the opening of the housing is at an acute angle with respect to the base; the acute angle being defined as that angle subtended between the base of the tooth when the bracket is in use and the opening of the housing.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as distributing better the tension forces of the archwire onto the teeth.

This problem is solved in the present application by inclining the opening of the housing with respect to the base so that when the bracket is fixed to the labial side of the teeth the forces transmitted by the archwire will be more perpendicular to the overall direction of the teeth and hence be more homogeneous.

The cited prior arts do not deal with this problem, nor would it be obvious for the skilled person to adapt the brackets of the prior art so as to arrive at the subject matter of the present application. The latter is thus also deemed inventive (Art. 33(3) PCT).

Claims 2-16 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

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EXAMINATION REPORT - SEPARATE SHEET**

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## BRACKET FOR ORTHODONTICS

Description

The present invention relates to a bracket for use in lingual orthodontics and to an orthodontic implant therefor. In particular, the invention relates to an orthodontic bracket of the type comprising a base adapted to be fastened onto the lingual side of a tooth, one or more engaging tabs to hold a fastening system for the dental arc and a housing for an orthodontic wire extending along the dental arc.

The term "lingual orthodontics" generally means the technique which consists of placing orthodontic implants on the lingual side of the teeth. Such implants typically consist of a plurality of brackets, each fastened to a respective tooth. Through these brackets is placed an orthodontic wire, in such a way that the wire extends along the dental arc. The orthodontic wire, which can have circular, square or rectangular cross section, and different metallic composition, is brought to a desired tensioning state, both for containment purposes and for corrective dental movements.

Lingual orthodontics offers important aesthetic and bio-mechanical advantages over labial orthodontics. Its implants are invisible from the exterior and, bio-mechanically, they entail advantages for the application of forces relative to the axis passing through the centre of resistance of the tooth. All with the same therapeutic results as traditional external (labial) orthodontic techniques.

However, currently available lingual brackets have some drawbacks. First of all, they do not allow a satisfactory control over rotation, due to the reduced flexural and torsional capabilities of the orthodontic wire, to the detriment of the therapeutic effects and of the time required to achieve them.

Moreover, they have rather large dimensions, in particular in terms of thickness, and this makes them not very comfortable for the patient in terms of tactile perception of the tongue and hygiene. Also because of such excessive dimensions, the patient generally experiences speech difficulties.

An example of a known bracket is disclosed in US-A-4 917 602. Such document discloses a bracket for orthodontic. Such device is an adjustable bracket assembly characterised in that its tabs are slidingly connected to the base in order to allow an adjustment of the device. Furthermore, all the embodiments therein disclosed have an housing for the archwire which is exactly perpendicular to the base, making it proper to be used as a labial bracket. Nevertheless, bearing in mind the natural conformation of the teeth (which have the lingual side inclined), the brackets therein

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disclosed cannot be correctly used as lingual brackets. In fact, once applied they would have the housing for the archwire not correctly oriented with respect to the overall direction of the tooth, being it perpendicular to the surface of the base.

5 The technical problem constituting the basis for the present invention, therefore, is to provide an orthodontic bracket which allows to overcome the drawbacks mentioned above with reference to the prior art.

Said problem is solved by an orthodontic bracket according to claim 1.

According to the same inventive concept, the present invention also relates to an orthodontic implant according to claim 15.

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Claims

1. A lingual orthodontic bracket (1), comprising:

- a base (2) adapted to be fastened onto the lingual side of a tooth;
- a main body (2) raising from the base (2), said main body being constructed in a single piece with the base (2) and having a plurality of projecting engaging tabs (4, 5, 6) apt to engage and retain a binding system (9) for the dental arc;
- a housing (3) for an orthodontic wire (8) which extends along the dental arc, said housing (3) being interposed between the tabs (4, 5, 6) and inclined so to form an acute angle with respect to the base (2), said acute angle opening towards a bottom of the tooth when the bracket is fastened onto the inclined lingual side of the tooth; and
- a retaining member (7) for retaining the orthodontic wire within said housing (3), wherein said retaining member (7) faces said housing (3) and extends only along a limited segment (30) of the latter, the arrangement being such that said retaining member (7) abuts the orthodontic wire (8) received in said housing (3).

2. The orthodontic bracket (1) as claimed in claim 1, wherein said retaining member is in the form of a projecting fin (7).

3. The orthodontic bracket (1) as claimed in claim 1 or 2, wherein said retaining member (7) has a substantially wedge shaped profile.

4. The orthodontic bracket (1) as claimed in any of the previous claims, wherein said retaining member (7) is in a centred position relative to said housing (3).

5. The orthodontic bracket (1) as claimed in any of the previous claims, wherein said retaining member (7) is integral with the remaining part of the bracket itself.

25 6. The orthodontic bracket (1) as claimed in any of the previous claims, wherein said retaining member (7) is constructed in a single piece with the remaining part of the bracket itself.

7. The orthodontic bracket (1) as claimed in any of the previous claims, wherein said retaining member (7) is arranged superiorly to the tabs (4, 5, 6) of said plurality.

30 8. The orthodontic bracket (1) as claimed in any of the previous claims, wherein said retaining member (7) has a rounded profile (70) apt not to injure the patient's tongue.

9. The orthodontic bracket (1) as claimed in any of the previous claims, having a

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thickness, defined between said base (2) and said retaining member (7); included in an interval of about 1÷1.2 mm.

10. The orthodontic bracket (1) as claimed in any of the previous claims, wherein said plurality of tabs comprises a first (4), a second (5) and a third (6) tab, said first (4) and second (5) tab being arranged at the opposite side of said housing (3) with respect to said third tab (6).

5 11. The orthodontic bracket (1) as claimed in the previous claim, wherein said retaining member (7) is arranged between said first (4) and second (5) tab and is oriented in the opposite direction relative thereto.

10 12. The orthodontic bracket (1) as claimed in any of the previous claims, wherein the tabs (4, 5, 6) of said plurality have a rounded profile (40, 50, 60) apt not to injure the patient's tongue.

15 13. The orthodontic bracket (1) as claimed in any of the previous claims, wherein said housing (3) is in the form of a groove extending transversely relative to said base (2).

14. The orthodontic bracket (1) as claimed in any of the previous claims, wherein said housing (3) is defined by two or more walls set longitudinally side by side, having a cross section with a broken-line profile.

20 15. An orthodontic implant (100) for lingual orthodontics, comprising an orthodontic bracket (1) as claimed in any of the previous claims.

16. The orthodontic implant (100) as claimed in the previous claim, comprising an orthodontic wire (8) apt to be inserted in said housing (3) and, in such an arrangement, to abut said retaining member (7).